(FILE 'USPAT' ENTERED AT 08:44:08 ON 05 FEB 1998)

L1	146539	S	BIT
L2	71712	S	CONE
L3	108338	S	TEETH
L4	14787	S	GAGE
L5	16691	S	HEEL
L6	45	S	L1 AND L2 AND L3 AND L4 AND L5
L7	5408	S	L1 AND L3
L8	40	S	L6 AND 175/CLAS
L9	5	S	L6 NOT L8
L10	179	S	SPHERICAL(P) TUNGSTEN CARBIDE
L11	10	S	L7 AND L10
L12	8	S	L11 NOT L8
L13	1	S	4673044/PN
L14	1	S	L13 AND L10
L15	1	S	L13 AND (MESH OR MICRONS OR INCH? OR SIZE)
L16	1	S	L13 AND STEEL
L17	1	S	L13 AND PERCENT

(FILE 'USPAT' ENTERED AT 07:42:45 ON 05 FEB 1998)
SET HIGH OFF
L1 146539 S BIT
L2 71712 S CONE
L3 108338 S TEETH
L4 14787 S GAGE
L5 16691 S HEEL
L6 45 S L1 AND L2 AND L3 AND L4 AND L5
L7 40 S L6 AND 175/CLAS
SET HIGH ON
L8 1 S SPHERICAL(P)TUNSTEN CARBIDE
L9 179 S SPHERICAL(P)TUNGSTEN CARBIDE
L10 179 S L8 OR L9
L11 2 S L7 AND L10
L12 0 S L11 AND MESH
L13 0 S L11 AND MICRONS
L14 0 S L11 AND PARTICLE SIZE
L15 5 S L6 NOT L7
L16 0 S L9 AND L15
L17 5408 S L1 AND L3
L18 5368 S L17 NOT L7
L19 937 S L18 AND 175/CLAS
L20 5 S L10 AND L19
L21 1 S L20 AND (MESH OR MICRONS OR PARTICLE SIZE)

=> d l11 1-2

1. 4,203,496, May 20, 1980, Longitudinal axis roller drill bit with gage inserts protection; William Baker, III, et al., 175/432, 343, 348, 374 [IMAGE AVAILABLE]

2. 3,800,891, Apr. 2, 1974, HARDFACING COMPOSITIONS AND GAGE HARDFACING ON ROLLING CUTTER ROCK BITS; Anderson D. White, et al., 175/374; 428/539.5, 679, 684 [IMAGE AVAILABLE]

=> d l21

1. 5,492,186, Feb. 20, 1996, Steel tooth bit with a bi-metallic gage hardfacing; James L. Overstreet, et al., **175/374** [IMAGE AVAILABLE]

=> d l11 1-2 kwic

US PAT NO: 4,203,496 [IMAGE AVAILABLE] L11: 1 of 2

ABSTRACT:
A . . . with respect to the main axis. The journal pin has a cutter rotatively mounted thereon, with the cutter having a **spherical** outer surface which has a plurality of inner rows of **tungsten** **carbide** mounted thereon. The gage row of the cutter is also formed on the **spherical** outer surface and defines a plane intersecting the intersection of the main and second axes. The cutter gage row is. . .

DETDESC:

DETD(7)

A plurality of **tungsten** **carbide** inserts 43 and 44 are formed in inner rows on the **spherical** surface 40 of the cutter 20. It should be noted that the distinction between the inserts 43 and 44 is that they are oriented 90 degrees with respect to each other. A gage row is also formed on the **spherical** surface 40 which defines a plane C--C which intersects the intersection of the axes A--A and B--B at point D.. . . comprises a base portion 51 supporting a cutting surface 52 made of synthetic diamond material and a substrate 53 of **tungsten** **carbide**. The cutting elements 50 are oriented on the gage row in such a manner that the cutting surfaces 52 of. . .

US PAT NO: 3,800,891 [IMAGE AVAILABLE] L11: 2 of 2

SUMMARY:

BSUM(14)

The present invention, in one of its broadest and simplest aspects, is that of substituting sintered **tungsten** **carbide** granules for the cast fragments of **tungsten** **carbide** known in the prior art, other constituents and procedures being essentially the same. The invention also involves varying the type of metallic binder used to knit the **tungsten** **carbide** grains into a tough, abrasive granule, employing not only the usual cobalt but alternative binders including either of the other. . . to 15 percent by weight, about 6 percent being the preferred fraction. The granules are preferably of rounded and roughly **spherical** shapes, avoiding sharp edges and slivers which can easily go into solution in the welding matrix. The size of the. . . range of 0.009 inch to 0.093 inch largest cross sectional dimensions being typical of the present invention. The compositions using **tungsten**, **carbide** with binders other than cobalt are believed to be novel in

applications on all cutting tools and surfaces requiring abrasion. . .

=> d l21 kwic

US PAT NO: 5,492,186 [IMAGE AVAILABLE] L21: 1 of 1
US-CL-CURRENT: **175/374**

ABSTRACT:
An . . . boring bit rotatable cutter having a first hardfacing composition of carbide particles selected from the class of cast and macrocrystalline **tungsten** **carbide** dispersed in a steel matrix deposited on the gage surface of at least some of the heel row teeth. A. . . resistance and a lower level of fracture resistance. A second hardfacing composition of carbide particles selected from the class of **spherical** sintered and **spherical** cast tungsten is dispersed in a steel matrix deposited over at least the crest and an upper portion of the. . .

SUMMARY:

BSUM(12)

Sintered or cemented tungsten carbide consists of small particles of tungsten carbide, usually in the range of 1 to 15 **microns** bonded in a "binder" selected from the iron group metal of cobalt, nickel and iron, commonly cobalt. Tungsten carbide particles. . .

SUMMARY:

BSUM(13)

Since . . . has been essentially uninterrupted since the 1930's, there are numerous metallurgical mixtures or compositions that coordinate the type of carbide, **particle** **size** and matrix composition. The gage surface of a rolling cutter bit constantly rubs against the wall of the borehole and. . .

SUMMARY:

BSUM(17)

This . . . least one cutter having a first hardfacing composition of carbide particles selected from the group consisting of cast and macrocrystalline **tungsten** **carbide** dispersed in a steel matrix

deposited on the gage surface of at least some of the heel row teeth. Thus,. . . resistance. A second hardfacing composition of softer but less brittle carbide particles is selected preferably from the group consisting of **spherical**, sintered and cast **tungsten** **carbide** is dispersed in a steel matrix deposited over the crest of the teeth and an upper portion of the end. . .

DETDESC:

DETD(6)

The first hardfacing composition 53 contains particles selected from the group consisting of cast and macrocrystalline **tungsten** **carbide** dispersed in a steel matrix deposited on the gage surface of the heel row teeth. Thus, a substantial portion of. . . a lower level of fracture resistance. The second hardfacing composition 55 contains carbide particles selected from the group consisting of **spherical**, sintered and cast **tungsten** **carbide** dispersed in a steel matrix deposited over at least the crest and an upper portion of the gage surface adjacent. . .

DETDESC:

DETD(9)

The . . . a high level of abrasion resistance and a lower level of fracture resistance contained macrocrystalline tungsten carbide particles of 60-80 **mesh** applied in a mild steel 3/16 inch tube by oxyacetylene welding. The percent by weight of the tungsten carbide particles. . .

DETDESC:

DETD(10)

The first hardfacing composition 55, contained a mixture of cemented tungsten carbide spheres of 16-30 **mesh** and particles of crushed cemented tungsten carbide of 20-30 **mesh** and crushed cast tungsten carbide of 60-80 **mesh**. The percent by weight of the above three tungsten carbide particles in the rod is respectively 66, 15 and 15%.. .

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CLAIMS:

CLMS(5)

5. . . . invention of claim 1 wherein the carbide particles of the first hardfacing composition are macrocrystalline tungsten carbide having a preapplication **mesh** size in a range of about 40 to 80.

CLAIMS:

CLMS(6)

6. . . . invention of claim 3 wherein the carbide particles of the second hardfacing composition comprise sintered tungsten carbide having a pre-application **mesh** size of 16 to 30.

CLAIMS:

CLMS(7)

7. The invention of claim 3 wherein the carbide particles comprise **spherical** sintered **tungsten** **carbide** having a **mesh** size in the range of 16 to 30 and cast particles having a **mesh** size in the range of 40 to 80.